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AMSAT NEWS SERVICE
ANS-349

The AMSAT News Service bulletins are a free, weekly news and information service of AMSAT North America, The Radio Amateur Satellite Corporation. ANS publishes news related to Amateur Radio in Space including reports on the activities of a worldwide group of Amateur Radio operators who share an active interest in designing, building, launching and communicating through analog and digital Amateur Radio satellites.

The news feed on http://www.amsat.org publishes news of Amateur Radio in Space as soon as our volunteers can post it.

Please send any amateur satellite news or reports to:
ans-editor at amsat.org.

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SB SAT @ AMSAT $ANS-349.01
ANS-349 AMSAT News Service Weekly Bulletins

AMSAT News Service Bulletin 349.01
   From AMSAT HQ SILVER SPRING, MD.
December 15, 2013
To All RADIO AMATEURS
BID: $ANS-349.01

KySat-2 Ham Radio Software Update

Jason Rexroat KK4AJE of the University of Kentucky KySat-2 team brings news of the latest version of the amateur radio ground station telemetry decoder software.

We really appreciate everyone using our ground station software to decode KySat-2 packets! We are continuing to take suggestions and made several more bug fixes, and the third version of this software is now available for download!

Link: http://ssl.engineering.uky.edu/amateur-radio-operators/
KySat-2 Info: http://kentuckyspace.com/ or http://kysat2.engr.uky.edu/

Our changelog is included in the download, and also copied below. Again, we appreciate all who have helped us gather telemetry from our satellite, and please continue to do so! Email us with any bugs or suggestions for improvements and we'll be sure to work on it!

Changelog:

- "Share" button to automatically email us our log files, along with counters showing how many beacons you've shared
- Custom COM port selection in case your created COM port doesn't show up in our list
- Drag and dockable tabs
- Packaged into single executable file

These changes will enable further customization on your part, and the automatic sharing will put the data into a format our automated scripts can handle to generate our running telemetry tables. I know that the ping functionality is still disabled, but we are pushing through further subsystem checkout that will allow us to enable this and other functionality for you!

Jason Rexroat KK4AJE
Space Systems Lab, University of Kentucky
jason.rexroat<at>uky.edu

Minotaur-1 ELaNa-4 Satellites http://amsat-uk.org/satellites/elana-4-cubesats/

[ANS thanks Jason Rexroat, KK4AJE, AMSAT-UK for the above announcement]

UKube-1 on its way to Kazakhstan

UKube-1 left Clyde Space in Glasgow on its way to Baikonur in Kazakhstan on December 12, 2013. The 3U CubeSat carries a set of AMSAT-UK FUNcube boards (FUNcube-2) to provide an Educational beacon and a 435/145 MHz linear transponder for amateur radio SSB/CW communications.

Reports on a space flight forum indicate that the Soyuz-2-1B/Fregat-M which will carry UKube-1 is currently expected to launch on March 27, 2014.

Russian launch schedule thread
http://forum.nasaspaceflight.com/index.php?topic=26990.450

Clyde Space on Facebook https://www.facebook.com/clydespace

[ANS thanks AMSAT-UK for the above announcement]

PUCP-SAT-1 Deploys POCKET-PUCP Femtosatellite

The Peruvian CubeSat PUCP-SAT-1 (145.840 MHz AX.25 FM) was carried by the microsatellite UNISAT-5 which was launched on a Dnepr on November 21, 2013.

When in orbit UNISAT-5 deployed PUCP-SAT-1 and Neilsao Vilchez reports PUCP-SAT-1 has in turn deployed an even smaller satellite POCKET-PUCP.

The femtosatellite POCKET-PUCP measures just 8.35 by 4.95 by 1.55 cm and has a 10 mW 12 wpm CW (On-Off-Keying OOK) beacon on 437.200 MHz. The team at the Pontificia Universidad Católica del Perú would welcome any reception reports.

Neilsao Vilchez says:

On Wednesday December 4 we detected our satellite PUCP-SAT-1 (launched from Dnepr RS-20/UNISAT-5).

We think it is one of the following objects:

-2013-066AC
-2013-066S
-2013-066T
-2013-066U

Which are very close to each other and we can not resolve which one it is.

We got our packet beacon at 145.840 MHz with packets stays 20 seconds, so, it is undoubtedly our beacon, we know that PUCP-SAT-1 is alive, healthy, it has been recharging its batteries okay.

On Friday, December 6, as planned, the POCKET-PUCP (femtosatellite) was released around 0800 UT, we are looking for its 437.200 MHz transmission at 12 wpm.

Its transmission is OA4PUCP SAT1 XXX YYY ZZZ

PUCP-SAT-1 website http://inras.pucp.edu.pe/en/proyectos/pucp-sat-1/especificaciones-del-satelite/

Facebook https://www.facebook.com/pucp

[ANS thanks AMSAT-UK for the above announcement]

FUNcube-1 Whole Orbit Data Available

The Data Warehouse now provides the facility to download FUNcube-1 (AO-73)Whole Orbit Data (WOD) as a .csv file. The file is produced at 23:59 every day and contains data for the preceding 24 hours. It contains all the channels shown on the WOD graph, which shows the latest orbit data captured.

The WOD page is at https://warehouse.funcube.org.uk/wod.html

[ANS thanks AMSAT-UK for the above announcement]

WRAPS: A Portable Satellite Antenna Rotator System

The January 2014 edition of QST contains an article by ARRL Education and Technology Program Coordinator Mark Spencer WA8SME on a portable azimuth and elevation rotator system for tracking satellites called WRAPS.

WRAPS stands for Wobbler RadFxSat Antenna Pointing System rotator system which Mark developed to support tracking CubeSats such as FUNcube-1 and the upcoming Fox-1 and RadFxSat/Fox-1B. His target audience includes school groups who want to access the capabilities of the CubeSats.

Thanks to Mark and the ARRL a copy of the article in PDF format is available here WRAPS - Mark Spencer WA8SME QST Jan 2014 Copyright ARRL. For personal use only - no copying, reprinting or distribution without written permission from the ARRL.

Mark Spencer WA8SME gave a presentation on WRAPS during the 2013 AMSAT Space Symposium in Houston, Texas, on Friday, November 1, 2013. His talk was recorded by Patrick Stoddard VA7EWK.

Apologies for missing the start of Mark's introduction, and for the quality of this video. The Symposium organizers dimmed the lights in the front of the room for this presentation, which meant Mark was essentially standing in the dark as he gave his presentation.

At the AMSAT Forum at the 2013 Dayton Hamvention the presentations on education wrapped up with a talk by Mark Spencer, ARRL Education & Technology Program Director. "Spence", WA8SME, briefly described his classroom experiments for measuring the "wobble" of the Fox satellite, demonstrating a Maximum Power Point Tracker (MPPT) for a solar array, and WRAPS a lower cost azimuth-elevation rotor system for lightweight satellite antennas.

A limited number of complete WRAPS systems will be available through the AMSAT-NA Store. As of December 12 they were not yet available, and AMSAT-NA do not at present have a firm date when they will be in stock. Because of uncertainty of the price and number which will be available, they are not taking advanced orders. When they are ready to process orders, AMSAT-NA will make the information public. Please do not call the AMSAT office.

ARRL http://www.arrl.org/

AMSAT-NA http://www.amsat.org/

Fox-1 http://ww2.amsat.org/?page_id=1113

[ANS thanks AMSAT-NA, the ARRL, and Spence, WA8SME, for the above announcement]

NASA video of ham radio participation in Juno

When NASA's Juno spacecraft flew past Earth on Oct. 9, 2013, it received a boost in speed of more than 7.3 kilometers per second, which set it on course for a July 4, 2016, rendezvous with Jupiter, the largest planet in our solar system.

During the flyby, Juno's Waves instrument, which is tasked with measuring radio and plasma waves in Jupiter's magnetosphere, recorded amateur radio signals. This was part of a public outreach effort involving ham radio operators from around the world. They were invited to say "HI" to Juno by coordinating radio transmissions that carried the same Morse-coded message.
Operators from every continent, including Antarctica, participated. The results can be seen in this video clip at

http://photojournal.jpl.nasa.gov/archive/PIA17744.mov

One of Juno's sensors, a special kind of camera optimized to track faint stars, also had a unique view of the Earth-moon system. The result was an intriguing, low-resolution glimpse of what our world would look like to a visitor from afar.

"If Captain Kirk of the USS Enterprise said, 'Take us home, Scotty,' this is what the crew would see," said Scott Bolton, Juno principal investigator at the Southwest Research Institute, San Antonio. "In the movie, you ride aboard Juno as it approaches Earth and then soars off into the blackness of space. No previous view of our world has ever captured the heavenly waltz of Earth and moon."

The cameras that took the images for the movie are located near the pointed tip of one of the spacecraft's three solar-array arms. They are part of Juno's Magnetic Field Investigation (MAG) and are normally used to determine the orientation of the magnetic sensors. These cameras look away from the sunlit side of the solar array, so as the spacecraft approached, the system's four cameras pointed toward Earth. Earth and the moon came into view when Juno was about 600,000 miles (966,000 kilometers) away - about three times the Earth-Moon separation.

During the flyby, timing was everything. Juno was traveling about twice as fast as a typical satellite, and the spacecraft itself was spinning at 2 rpm. To assemble a movie that wouldn't make viewers dizzy, the star tracker had to capture a frame each time the camera was facing Earth at exactly the right instant. The frames were sent to Earth, where they were processed into video format.

"Everything we humans are and everything we do is represented in that view," said the star tracker's designer, John Jørgensen of the Danish Technical University, near Copenhagen.

"With the Earth flyby completed, Juno is now on course for arrival at Jupiter on July 4, 2016," said Rick Nybakken, Juno project manager at NASA's Jet Propulsion Laboratory in Pasadena, Calif.

The Juno spacecraft was launched from Kennedy Space Center in Florida on August 5, 2011. Juno's launch vehicle was capable of giving the spacecraft only enough energy to reach the asteroid belt, at which point the sun's gravity pulled it back toward the inner solar system. Mission planners designed the swing by Earth as a gravity assist to increase the spacecraft's speed relative to the

sun, so that it could reach Jupiter. (The spacecraft's speed relative to Earth before and after the flyby is unchanged.)

After Juno arrives and enters into orbit around Jupiter in 2016, the spacecraft will circle the planet 33 times, from pole to pole, and use its collection of science instruments to probe beneath the gas giant's obscuring cloud cover. Scientists will learn about Jupiter's origins, internal structure, atmosphere and magnetosphere.

Source: http://www.jpl.nasa.gov/news/news.php?release=2013-360

Radio Hams Say Hi To Juno
http://amsat-uk.org/2013/10/09/radio-hams-say-hi-to-juno/

[ANS thanks AMSAT-UK, and Andy Thomas, G0SFJ for the above announcement]

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10 GHz CubeSat ESTELLE to carry Cold Gas Thruster

The 2U ESTELLE will accommodate the QB50 scientific payload and an experimental miniaturized cold gas thruster module with four thrusters and 50grams of fuel.

This mission is a partnership between Estonia, Sweden, Latvia and Slovenia. The general hardware design will improve upon the single unit ESTCube-1, launched on May 7, 2013.

Cold gas propulsion system is seen as a very attractive solution for the CubeSats, as the standard limits the use of pyrotechnics and high-pressure systems. The propulsion module, developed by NanoSpace, uses butane under 2-5 bar pressure. This should be in accordance with the next CubeSat standard revision. The 0.3 unit module will be located at the opposite end from the QB50 payload. It contains four thrusters, which are placed on the same side for maximum delta-v capability (40 m/s). This delta-v capability can be used to alternate the orbit in order to enhance the scientific return of the QB50 mission by extending the satellite's lifetime.

An experimental high data rate transmitter (HDRT) is envisaged if it fits within the system margins to include it on-board the satellite. It would operate on S, C or X band amateur radio frequencies and use BPSK modulation. Up to 10 Mbit/s data rates can be achieved with 3 W of operating power.

Proposing a UHF GMSK/BPSK downlinks up to 19k2 bps and a series of HDRT experiments including a 2.4 GHz downlink using GFSK/BPSK at up to1Mbps, a 5.8 GHz downlink using GFSK and BPSK at up to 10Mbps and a 10 GHz downlink at up to 10 Mbp.

EstCube https://www.facebook.com/estcube

Swedish Space Corporation (SSC)
https://www.facebook.com/SSC.SwedishSpaceCorporation

NanoSpace http://www.sscspace.com/nanospace

Communication link design at 437.5 MHz for a nanosatellite
http://upcommons.upc.edu/pfc/bitstream/2099.1/19403/4/elec_2013_cante

ro_jorge.pdf

[ANS thanks AMSAT-UK for the above information]

$50SAT team seek help from radio hams

The $50SAT team is asking for help in capturing telemetry from the amateur radio 1.5U PocketQube satellite $50SAT on 437.505 MHz (+/-9 kHz Doppler shift) CW.

We are trying to determine the charging characteristics of the power system. The three team members all live above 40 degrees north and the satellite does not warm up enough during nighttime N-S passes to allow charging to begin. None of us are usually around during the daytime S-N passes and we would particularly appreciate telemetry reports when the satellite is in daylight.

Any form of report is welcome: decode of the fast Morse (120 WPM), RTTY demod, audio recording or I/Q capture from a FUNcube or RTL dongle would be greatly appreciated.

A link to a detailed description of the communications package can be found on the $50SAT website, http://www.50dollarsat.info/. The last distribution of Keps from AMSAT contain good elements for $50SAT.

$50SAT is one of the smallest amateur radio satellites ever launched at 5x5x7.5 cm and weighs only 210 grams. Transmitter power is just 100 mW.

Thanks,
Howie DeFelice AB2S
Email: howied231<at>hotmail.com

$50SAT has been a collaborative education project between Professor Bob Twiggs, KE6QMD, Morehead State University and three other radio amateurs, Howie DeFelice, AB2S, Michael Kirkhart, KD8QBA, and Stuart Robinson, GW7HPW.

The $50SAT team plan to make all the software and hardware designs freely available to anyone who wants them for personal or educational use. For further information see the $50SAT Dropbox at https://www.dropbox.com/sh/l3919wtfiywk2gf/-HxyXNsIr8

There is a discussion group for $50SAT at:
http://groups.yahoo.com/neo/groups/50dollarsat/conversations/topics

50DollarSat
http://www.50dollarsat.info/

HOPE RFM22B FSK transceiver
http://www.hoperf.com/rf/module/fsk/RFM22B.htm

PICAXE-40X2 microcontroller
http://www.picaxe.com/Hardware/PICAXE-Chips/PICAXE-40X2-microcontroller/

Revolution Education http://www.rev-ed.co.uk/

$50SAT Eagle2 PocketQube Operational
http://amsat-uk.org/2013/11/22/50sat-eagle2-pocketqube-operational/

[ANS thanks AMSAT-UK for the above announcement]

KB1WTW Addresses US House Committee

Dr. Sara Seager, KB1WTW, Class of 1941 Professor of Physics and Planetary Science Massachusetts Institute of Technology addressed the House Committee on Science, Space, and Technology, United States House of Representatives December 4, 2013.

Invited witnesses were:

Dr. Mary Voytek
Senior Scientist for Astrobiology, Planetary Science Division
National Aeronautics and Space Administration

Dr. Sara Seager KB1WTW
Class of 1941 Professor of Physics and Planetary Science
Massachusetts Institute of Technology

Dr. Steven Dick
Baruch S. Blumberg Chair of Astrobiology, John W. Kluge Center
Library of Congress

Dr. Sara Seager KB1WTW highlights the importance of CubeSats in education at 0:46 into this video.

Watch Astrobiology: Search for Biosignatures in our Solar System, House Space Committee, Dec 4, 13

This video was uploaded to YouTube by SpaceKSC
http://www.spaceksc.com/ Twitter @SpaceKSCBlog
Professor Sara Seager KB1WTW - Image credit MIT

Professor Sara Seager KB1WTW – Image credit MIT

Testimony of Dr. Sara Seager KB1WTW, Hearing on Astrobiology
http://astrobiology.com/2013/12/testimony-of-dr-sara-seager-hearing-on-astrobiology.html

Concord resident earns Genius Grant
http://www.wickedlocal.com/concord/news/x1868848071/Concord-resident-earns-Genius-Grant

Inflatable Antenna Could Give CubeSats Greater Reach
http://amsat-uk.org/2013/09/07/inflatable-antenna-could-give-cubesats-greater-reach/

How a Pocket-Size Satellite Could Find Another Earth
http://amsat-uk.org/2012/05/12/how-a-pocket-size-satellite-could-find-another-earth/

[ANS thanks AMSAT-UK and David J. Mercado, KK4MND for the above announcement]

ARISS News

SuccessfulARISS contact with Tochigi Science Lion Project,
Utsunomiya, Japan

An International Space Station school contact was completed with participants at Tochigi Science Lion Project, Utsunomiya, Japan on 14 Dec. The event was scheduled to begin at approximately 07:00 UTC. The duration of the contact was approximately 9 minutes and 30 seconds. 15 students asked their question to Koichi. Koichi answered all the questions. But 2 or 3 answers were very weak signal.
The contact was direct between NA1SS and 8N1ISS.

The ARISS school contact event was held as a part of the "Tochigi Science Lion Project". The project aims at constructing a science communication network in order to enhance interest in science and the science literacy of residents in Tochigi prefecture. Teikyo University manages the project and it is subsidized by JST (Japan Science and Technology Agency). The name of the project comes from the shape of Tochigi prefecture, which looks like the profile of a lion.

A group of students were selected from different elementary and junior high schools around Tochigi prefecture. There were 89 applicants, and 15 students were selected. The group consists of 12 elementary school students including 3 members of YAC (Young Astronauts Club), 2 junior high school students and a student from a school for the visually impaired.

Participants asked the following questions:

1. The moment you get into zero gravity, how is the condition of your body? And how do you feel?

2. It is said that the body's internal clock is set by the morning sun on Earth. Does your body's clock work even in space? When do you feel sleepy or hungry? Is it the same time as you are on Earth?

3. Please tell me how to put out a fire in case one breaks out on the "ISS."

4. What do you do if you feel bad and you can't work on the "ISS"?

5. Can you see "Ison Comet" in space?

6. How does your body pressure or your body's condition change between when you are on Earth and in space?

7. What do you think about "space debris"?

8. Do you sometimes quarrel with other astronauts?

9. When you became captain of the spaceship, what did you decide to do to organize the team?

10. Please tell me about your goals and dreams.

11. Tochigi is famous for strawberries. If we were to grow them in space, what shape would they become?

12. Is there any thing that you think is more convenient in space than on Earth?

13. What kinds of space foods do you have? Aren't you bored with space foods?

14. If you cut onions in space, do your tears still run down your face?

15. While training to become an astronaut, did you have any problems? What is your motivation to make your dreams come true?

PLEASE CHECK THE FOLLOWING FOR MORE INFORMATION ON ARISS UPDATES:

Sign up for the SAREX maillist at
http://www.amsat.org/mailman/listinfo/sarex

Visit ARISS on Facebook. We can be found at Amateur Radio on the International Space Station (ARISS).

To receive our Twitter updates, follow @ARISS_status

Next planned event(s):

1. Istituto Tecnico Industriale "Galileo Ferraris", San Giovanni Valdarno, Italy, direct via IQ5GX
Mon, 16Dec2013, 16:28 UTC

ARISS is an international educational outreach program partnering the participating space agencies, NASA, Russian Space Agency, ESA, CNES, JAXA, and CSA, with the AMSAT and IARU organizations from participating countries.

ARISS offers an opportunity for students to experience the excitement of Amateur Radio by talking directly with crewmembers on-board the International Space Station. Teachers, parents and communities see, first hand, how Amateur Radio and crewmembers on ISS can energize youngsters' interest in science, technology, and learning. Further information on the ARISS program is available on the website http://www.ariss.org/ (graciously hosted by the Radio Amateurs of Canada).

[ANS thanks David Jordan, AA4KN, and ARISS for the above information]

Satellite Shorts from all over

LITHUANIA, LY. Vilmantas
LY3BY is QRV as LY2013SAT until December 24 to commemorate the first Lithuanian nano-satellite LituanicaSAT-1.
QSL via LY3BY.

[AMSAT thanks the ARLD050 DX news for the above short)

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In addition to regular membership, AMSAT offers membership in the President's Club. Members of the President's Club, as sustaining donors to AMSAT Project Funds, will be eligible to receive additional benefits. Application forms are available from the AMSAT Office.

Primary and secondary school students are eligible for membership at one-half the standard yearly rate. Post-secondary school students enrolled in at least half time status shall be eligible for the student rate for a maximum of 6 post-secondary years in this status. Contact Martha at the AMSAT Office for additional student membership information.

73,
This week's ANS Editor,
Joe Spier, K6WAO
k6wao at amsat dot org